

***** **CONFIDENTIAL** *****
 ***** **PREDECISIONAL DOCUMENT** *****
SUMMARY SCORESHEET
FOR COMPUTING PROJECTED HRS SCORE

SITE NAME: Long Beach Naval ShipyardCITY: Long BeachCOUNTY: Los AngelesEPA ID #: CA1170090483EVALUATOR: Nate JohnsonJOB #: 41-62311.12SCORE DATE: November 19, 1993LATITUDE: 33° 45' 36" NLONGITUDE: 118° 13' 23" WT/R/S 5S / 13W / 10THIS SCORESHEET IS FOR A: ☐ PA ☐ SI ☐ ESI ☐ SI Sum ☐ PA Sum ☒ Other (Specify)Federal Facility SI ReviewRCRA STATUS (check all that apply): ☒ Generator☐ Small Quantity Generator☒ Transporter☒ TSDF☐ Not listed in RCRA Database as of (date of print out) _____

STATE SUPERFUND STATUS

☐ BEP (date) _____☐ WQARF (date) _____☒ No State Superfund Status (date) 8/11/93

	S pathway	S ² pathway
Groundwater Migration Pathway Score (S _{gw})	15.96	254.7216
Surface Water Migration Pathway Score (S _{sw})	100	10,000
Soil Exposure Pathway Score (S _s)	*	
Air Migration Pathway Score (S _a)	24.3	590.49
$S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,845.2116
$(S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2) / 4$		2,711.3029
$\sqrt{(S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2) / 4}$		52.07

Pathways not assigned a score (explain):

* Pathways evaluated qualitatively not quantitatively. Limited areas of exposed contaminated soil on-site.
 Facility not accessible to the public.

GROUNDWATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors

<u>Likelihood of Release</u>	<u>Maximum Value</u>	<u>Projected Score</u>	<u>Rationale</u>	<u>Data Qual.</u>
1. Observed Release	550	550	1	H
2. Potential to Release				
2a. Containment	10			
2b. Net Precipitation	10			
2c. Depth to Aquifer	5			
2d. Travel Time	35			
2e. Potential to Release (lines 2a x (2b+2c+2d))	500			
3. Likelihood of Release (higher of lines 1 or 2e)	550	550		

Waste Characteristics

4. Toxicity/Mobility	a	10,000	2	H
5. Hazardous Waste Quantity	a	10	3	H
6. Waste Characteristics (lines 4x5, then use table 2-7)	100	18		

Targets

7. Nearest Well	50	2	4	H
8. Population ^d				
8a. Level I Concentrations	b	0	5	H
8b. Level II Concentrations	b	0	5	H
8c. Potential Contamination	b	131	6	H
8d. Population (lines 8a+8b+8c)	b	133		
9. Resources	5	0	7	H
10. Wellhead Protection Area	20	0	8	H
11. Targets (lines 7+8d+9+10)	b	133		

Likelihood of Release

12. Aquifer Score [(lines 3 x 6 x 11)/82,500] ^c	100	15.96		
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Groundwater Migration Pathway Score

13. Pathway Score (Sgw), (highest value from line 12 for all aquifers evaluated)	100	15.96	^c
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Aquifer Evaluated Silverado

- a** Maximum value applies to waste characteristics category.
b Maximum value not applicable.
c Do not round to nearest integer.
d Use additional tables.

GROUNDWATER PATHWAY CALCULATIONS

8. Population

Actual Contamination

Well Identifier	Contaminant Detected	Concentration (note units)	Benchmark	(A) Apportioned Population Well Serves	(B) Level* Multip.	(A x B)
Sum (AxB) Level I						
Sum (AxB) Level II						

* Multipliers

- Level I = 10
- Level II = 1

Potential Contamination

Distance (Miles)	Total Number of Wells Within Distance Ring	Total Population Served by Wells Within Distance Ring	Distance-Weighted Population Values "Other Than Karst" (Table 3-12)** (A)
0 - 1/4	0	0	0
> 1/4 to 1/2	0	0	0
> 1/2 to 1	0	0	0
> 1 to 2	0	0	0
>2 to 3	0	0	0
>3 to 4	2	21,000	1,306
Sum (A)			1,306

Potential contamination = $\frac{\text{Sum (A)}}{10} = 131$

** For drinking water wells that draw from a karst aquifer, see the Distance-Weighted Population Values for "Karst" in Table 3-12.

Aquifer Evaluated Silverado

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor Categories and Factors

DRINKING WATER THREAT

<u>Likelihood of Release</u>	<u>Maximum Value</u>	<u>Projected Score</u>	<u>Rationale</u>	<u>Data Qual.</u>
1. Observed Release	550	550	1	H
2. Potential to Release by Overland Flow				
2a. Containment	10			
2b. Runoff	25			
2c. Distance to Surface Water	25			
2d. Potential to Release by Overland Flow [lines 2a x (2b+2c)]	500			
3. Potential to Release by Flood				
3a. Containment (Flood)	10			
3b. Flood Frequency	50			
3c. Potential to Release by Flood (lines 3a x 3b)	500			
4. Potential to Release (Lines 2d + 3c, subject to a maximum of 500)	500			
5. Likelihood of Release (Higher of lines 1 or 4)	550	550	1	H

Waste Characteristics

6. Toxicity/Persistence	a	10,000	2	H
7. Hazardous Waste Quantity	a	10,000	3	H
8. Waste Characteristics (lines 6 x 7, then assign a value from Table 2-7)	100	100		

Targets

9. Nearest Intake	50			
10. Population ^d				
10a. Level I Concentrations	b			
10b. Level II Concentrations	b			
10c. Potential Contamination	b			
10d. Population (lines 10a + 10b + 10c)	b			
11. Resources	5			
12. Targets (lines 9 + 10d + 11)	b	0	4	H

Drinking Water Threat Score

13. Drinking Water Threat [(Lines 5 x 8 x 12)/82,500. Subject to a maximum of 100]	100	0		
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SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

(Continued)

Factor Categories and Factors**HUMAN FOOD CHAIN THREAT**

<u>Likelihood of Release</u>	<u>Maximum Value</u>	<u>Projected Score</u>	<u>Rationale</u>	<u>Data Qual.</u>
14. Likelihood of Release (Same value as line 5)	550	550	1	H
<u>Waste Characteristics</u>				
15. Toxicity/Persistence/ Bioaccumulation	a	500,000,000	5	H
16. Hazardous Waste Quantity	a	10,000	3	H
17. Waste Characteristics (Toxicity/Persistence x Hazardous Waste Quantity x Bioaccumulation, then assign a value from Table 2-7)	1,000	1,000		
<u>Targets</u>				
18. Food Chain Individual	50	45	6	H
19. Population ^d				
19a. Level I Concentrations	b	0	7	H
19b. Level II Concentrations	b	0	8	H
19c. Potential Human Food Chain Contamination	b	3	9	H
19d. Population (lines 19a + 19b + 19c)	b	3		
20. Targets (Lines 18 + 19d)	b	48		
<u>Human Food Chain Threat Score</u>				
21. Human Food Chain Threat [(Lines 14 x 17 x 20)/82,500 subject to a maximum of 100]	100	100		

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

(Continued)

Factor Categories and Factors

ENVIRONMENTAL THREAT

<u>Likelihood of Release</u>	<u>Maximum Value</u>	<u>Projected Score</u>	<u>Rationale</u>	<u>Data Qual.</u>
22. Likelihood of Release (Same value as line 5)	550	550	1	H
<u>Waste Characteristics</u>				
23. Ecosystem Toxicity/Persistence Bioaccumulation	a	500,000,000	10	H
24. Hazardous Waste Quantity	a	10,000	3	H
25. Waste Characteristics (EcosystemTox./Persistence x Hazardous Waste Quantity x Bioaccumulation, then assign a value from Table 2-7)	1,000	1,000		

Targets

26. Sensitive Environments ^d				
26a. Level I Concentrations	b	0	11	H
26b. Level II Concentrations	b	175	12	H
26c. Potential Contamination	b	0.00575	13	H
26d. Sensitive Environments (lines 26a + 26b + 26c)	b	175.00575		
27. Targets (Value from line 26d)	b	175.00575		

Environmental Threat Score

28. Environmental Threat Score [(Lines 22 x 25 x 27)/82,500 subject to a maximum of 60]	60	60		
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SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED

29. Watershed Score [(Lines 13 + 21 +28), subject to a maximum of 100]	100	100 ^c
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SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED

30. Component Score (Sof) (Highest score from Line 29 for all watersheds evaluated subject to a maximum of 100)	100	100 ^c
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- a Maximum value applies to waste characteristics category.
- b Maximum value not applicable.
- c Do not round to nearest integer.
- d Use additional tables.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

(Continued)

20. Food Chain Targets

Actual Contamination

Fishery	Contaminant	Concentration	Benchmark	(A) Assigned Population Value (Table 4-18)	(B) Level* Multip.	(A x B)

*** Level Multipliers**

- Level I = 10
- Level II = 1

Sum (A x B) Level I

Sum (A x B) Level II

Potential Contamination

Fishery	Production (lb/yr)	(P) Assigned Population Value (Table 4-18)	Average Stream Flow at Fishery (cfs)	(DW) Dilution Weighting Factor (Table 4-13)	(P x DW)
Pacific Ocean	159,574,000	310,000	NA	0.0001	31
Sum (P x DW)					31

Potential contamination = $\frac{\text{Sum (P x DW)}}{10} = 3$

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

(Continued)

27. Environmental Targets

Actual Contamination

Sensitive Environment or Wetland Length (mi.)	Contaminant	Concentration	Benchmark	(A) Assigned Value (Table 4-23 and/or 4-24)	(B) Level* Multip.	(A x B)
CA Brown Pelican	PCB-1254	3,800 mg/Kg	NA-sediment	75	1	75
CA Coastal Waters	PCB-1254	3,800 mg/Kg	NA-sediment	100	1	100

*** Level Multipliers**

- Level I = 10
- Level II = 1

Sum (A x B) Level I

Sum (A x B) Level II

175

Potential Contamination

Sensitive Environment or Wetland Length (miles)	(P) Assigned Value (Table 4-23 and/or 4-24)	Average Stream Flow at Fishery (cfs)	(DW) Dilution Weighting Factor (Table 4-13)	(A x DW)
Salt marsh bird's beak	75		0.0001	0.0075
California least tern	75		0.0001	0.0075
Light-footed clapper rail	75		0.0001	0.0075
Lyons pentachaeta	75		0.0001	0.0075
Ventura marsh milk vetch	75		0.0001	0.0075
Wester snowy plover	50		0.0001	0.005
			Sum (A x DW)	0.0425

Potential contamination = $\frac{\text{Sum (A x DW)}}{10} = 0.00425$

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

(Continued)

27. Environmental Targets

Actual Contamination

Sensitive Environment or Wetland Length (mi.)	Contaminant Concentration	Benchmark	(A) Assigned Value (Table 4-23 and/or 4-24)	(B) Level* Multip.	(A x B)

*** Level Multipliers**

- Level I = 10

- Level II = 1

Sum (A x B) Level I

Sum (A x B) Level II

Potential Contamination

Sensitive Environment or Wetland Length (miles)	(P) Assigned Value (Table 4-23 and/or 4-24)	Average Stream Flow at Fishery (cfs)	(DW) Dilution Weighting Factor (Table 4-13)	(A x DW)
Bright green dudleya	50		0.0001	0.005
Belding's savannah sparrow	50		0.0001	0.005
Aphanisma	50		0.0001	0.005
Sum (A x DW)				0.015

Potential contamination = $\frac{\text{Sum (A x DW)}}{10} = 0.0015$

AIR MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors

<u>Likelihood of Release</u>	<u>Maximum Value</u>	<u>Projected Score</u>	<u>Rationale</u>	<u>Data Qual.</u>
1. Observed Release	550	0	1	H
2. Potential to Release ^e				
2a. Gas Potential	500	360	2	H
2b. Particulate Potential	500	390	3	H
2c. Potential to Release (higher of lines 2a and 2b)	500	390		
3. Likelihood of Release (higher of lines 1 or 2c)	550	390		

Waste Characteristics

4. Toxicity/Mobility	a	2,000	4	H
5. Hazardous Waste Quantity	a	10	5	H
6. Waste Characteristics (lines 4x5, then use table 2-7)	100	10		

Targets

7. Nearest Individual	50	20	6	H
8. Population ^e				
8a. Level I Concentrations	b	0	7	H
8b. Level II Concentrations	b	0	7	H
8c. Potential Contamination ^e	b	494	8	H
8d. Population (lines 8a+8b+8c)	b	494		
9. Resources	5	0	9	H
10. Sensitive Environments ^e				
10a. Actual Contamination	c	0	7	H
10b. Potential Contamination	c	0.44	10	H
10c. Sensitive Environments (lines 10a+10b)	c	0.44		
11. Targets (lines 7+8d+9+10c)	b	514.44		

Air Pathway Migration Score

12. Air Pathway Migration Score (Sa) [(lines 3x6x11)/82,500]	100	24.3	^d
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- a Maximum value applies to waste characteristics category.
b Maximum value not applicable.
c No specific maximum value applies to factor. However, pathway score based solely on sensitive environments is limited to a maximum of 60.
d Do not round to nearest integer.
e Use additional tables.

AIR PATHWAY CALCULATIONS

2. Potential to Release

Gas Potential to Release

Source Type (Name)	Gas Contaminant Factor Value (Table 6-3)	Gas Source Type Factor Value (Table 6-4)	Gas Migration Potential Factor Value (Table 6-7)	Sum	Gas Source Value
	(A)	(B)	(C)	(B+C)	A x (B+C)
1. Contam. Soil at AOC 8	10	19	17	36	360
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
Gas Potential to Release Factor Value (Select the highest Gas Source Value)					360

Particulate Potential to Release

Source Type (Name)	Particulate Contaminant Factor Value (Table 6-3)	Particulate Source Type Factor Value (Table 6-4)	Particulate Migration Potential Factor Value (Table 6-7)	Sum	Particulate Source Value
	(A)	(B)	(C)	(B+C)	A x (B+C)
1. Contam. Soil at AOC 11	10	22	17	39	390
2. _____	_____	_____	_____	_____	_____
3. Contam. Soil at AOC 12	10	22	17	39	390
4. _____	_____	_____	_____	_____	_____
Particulate Potential to Release Factor Value (Select the highest Particulate Source Value)					390

AIR PATHWAY CALCULATIONS

(Continued)

8. Particulate Potential to Release

Distance (miles)	Total Population Within Distance Ring	(A) Distance-Weighted Population Value (Table 6-17)
On a source (0)	0	0
>0 to 0.25	23,796	4,081
>0.25 to 0.5	2,300	88
>0.5 to 1.0	4,701	83
>1.0 to 2.0	27,055	83
>2.0 to 3.0	113,412	375
>3.0 to 4.0	155,018	229
Sum of (A) =		4,939

Air Potential Contamination Factor Value = $\frac{\text{Sum of (A)}}{10} = 494$

10. Sensitive Environments

Wetland or Type of Sensitive Environment	(A) Sensitive Environment Rating Value (Table 4-23)	(B) Wetland Rating Value (Table 6-18)	(A+B)
Actual Contamination Factor Value [sum (A+B)]			

AIR PATHWAY CALCULATIONS

(Continued)

Potential Contamination

[illegible]

Potential Contamination

Potential Contamination Sensitive Environments Factor Value = $\frac{\text{Sum of DW x (A+B)}}{10}$ = **0.44**

*** Only assign a Wetland Rating Value once for each Wetland within a distance category.**

**HRS Rationale
Long Beach Naval Shipyard
CA1170090483**

Groundwater Pathway

GW-1: An observed release to groundwater has been documented at the Naval Shipyard in Long Beach. Groundwater sampling has revealed the presence of several contaminants, including arsenic, mercury, and trichloroethene (TCE), attributable to the Naval Shipyard in groundwater underlying the site. The groundwater samples were collected from monitoring wells installed during the September 1991 Site Inspection (SI) sampling event. In addition, some hydropunch groundwater samples were collected from soil borings during the SI sampling event. Releases of site attributable contaminants have been documented at Areas of Concern (AOCs) 9 and 10 at the Naval Shipyard. A discussion of the documentation of groundwater contamination attributable to the two sites follows.

AOC 9:

A spill of TCE reportedly occurred in 1974 or 1975 on the paved area north of Building 129 at AOC 9. The spill apparently involved approximately fifteen 55-gallons drums of TCE and caused the asphalt pavement to buckle.

Six soil borings (B-26, MW-27, B-48, B-49, B-50, and B-51) were drilled around Site 9, outside of Building 129. One of the borings was completed as a monitoring well (MW-27). TCE was detected in a soil sample collected at 5 feet below ground surface (bgs) from MW-27 at 90 micrograms per kilogram ($\mu\text{g/Kg}$). In addition, TCE was detected in groundwater at MW-27 at 81 micrograms per liter ($\mu\text{g/L}$). TCE was not detected in background groundwater samples B-11 and B-22 (detection limit 5 $\mu\text{g/L}$).

AOC 10:

The hazardous materials stored in this area included batteries, waste oil, mercury, and spent sandblast material. According to the Navy, the general procedure for disposal of the battery acid was to pour the acid out on the ground. Apparently, up to 2,400 gallons per year may have been disposed of in this manner. In addition, mercury was occasionally spilled on the ground at the radar equipment storage area in the Lot H scrapyard. No information was provided in the SI documentation regarding the quantity of mercury that was spilled in this area.

Six soil borings (MW-28, B-29, B-30A, B-30B, B-31, and B-32) were drilled at Site 10. MW-28 was completed as a monitoring well. Analytical results from soil samples ranging from 1 to 5 feet bgs indicated the presence of chromium (77.8 milligrams per kilogram [mg/Kg]), copper (812 mg/Kg), iron (29,800 mg/Kg), mercury (3.0 mg/Kg), nickel (67.5 mg/Kg), lead (498 mg/Kg), and zinc (943 mg/Kg) at concentrations above three times background concentrations. Arsenic and manganese were detected in groundwater monitoring well MW-28 in excess of three times background concentrations. Arsenic was detected in

MW-28 at 27.4 µg/L. Arsenic was not detected in background hydropunch groundwater samples from B-11 and B-22 (detection limit = 9 µg/L). In addition, mercury was detected in hydropunch groundwater sample B-31 at 0.45 µg/L. Mercury was not detected in background hydropunch groundwater samples B-11 and B-22 (detection limit = 0.1 µg/L).

- GW-2: Mercury, arsenic, and TCE have been documented in groundwater underlying the Naval Shipyard. These contaminants were reportedly disposed of on-site. The toxicity and mobility factor values are presented in the table below.

**Toxicity and Mobility Factor Values for Contaminants of Concern
Naval Shipyard, Long Beach, CA**

Contaminant	Toxicity	Groundwater Mobility	Toxicity/Mobility
Mercury	10,000	1.0	10,000
Arsenic	10,000	0.01	100
TCE	10	0.01	0.1

Based on the above data, a toxicity/mobility factor value of 10,000 is assigned.

- GW-3: Documentation in the SI provides estimations of the annual quantities of waste disposed of at each site at the Naval Shipyard. However, there is not sufficient documentation available to calculate a waste quantity factor value. Therefore, a default hazardous waste quantity factor value of 10 is assigned. Although a default waste quantity factor value of 10 is assigned, URS has provided a calculation of the hazardous waste quantity factor value below. This calculation is based on waste quantities provided in the SI but is not used by URS in the HRS evaluation.

AOC 8: 200 gallons of TCE = 1.0 cubic yards of TCE

AOC 9: Fifteen 55-gallon drums of TCE spilled = 825 gallons = 4 cubic yards

AOC 10: 2,400 gallons acid/year x 6 years = 14,400 gallons = 72 cubic yards

AOC 11: 6,400 cubic yards of sandblast grit

AOC 12: Paint chip disposal pit = 15' x 15' x 10' = 2,250 cubic feet = 83 cubic yards

TOTAL: 6,560 cubic yards

Waste Quantity = $6,560 / 2.5 = 2,624$

Waste Quantity Factor Value = 100

- GW-4: The Dominguez Water Corporation operates an active well located approximately 3.5 miles northwest of the Naval Shipyard.

GW-5: There is no documentation available to URS indicating that groundwater wells within 4 miles of the site are contaminated with compounds attributable to the Naval Shipyard. Therefore, Level I and Level II concentration values have not been assigned.

GW-6: The Dominguez Water Corporation provides drinking water to a total of 100,000 people in the cities of Carson and Torrance. The Dominguez Water Corporation obtains 100 percent of its water from groundwater wells. The total water production for all wells operated by Dominguez Water Corporation is approximately 7,808 acre-feet. There are two active Dominguez wells within 4 miles of the Naval Shipyard. Both wells are located between 3 and 4 miles from the Naval Shipyard. These wells have groundwater extraction rates of 1,168 acre-feet and 432 acre-feet. Based on these figures, the two wells serve a combined population of approximately 21,000 people. A description of the municipal wells within 4 miles of the Naval Shipyard is provided in the table below.

**Descriptions of Municipal Wells Within 4 Miles of the Naval Shipyard
Long Beach, CA**

California State Well Number	4S/13W-15F1	4S/13W-29E5 *	43/13W-29E6
Total Depth (feet)	952	506	406
Depth of Perforations (feet)	588 - 740	196 - 410	196 - 214, 262 - 290, 350 - 410
Purveyor	Dominguez Water Company	Dominguez Water Company	Dominguez Water Company
Production Capacity (gpm)	2,450	3,150	NA
Approximate Population Served by Well	15,000	3,000	6,000
Groundwater Extractions for 7/90-6/91 (acre-feet)	1,167.53	220.93	431.66

* - Destroyed in 1991

NA - Not available

GW-7: There is no documentation available to URS indicating that irrigation or livestock wells are located within 4 miles of the Naval Shipyard.

GW-8: The Naval Shipyard is not located in a designated wellhead protection area.

Surface Water Pathway

SW-1: An observed release to surface water has been documented at the Naval Shipyard. According to SI documentation, from the early 1940s to the mid-1970s, drainage from various industrial areas, and from cleaning and process tanks was discharged to the West Basin of Long Beach Harbor directly through the storm water system and from flushing of the drydocks. An estimated 350,000 gallons of hazardous waste was disposed of annually in this manner. The wastes disposed of to the harbor included polychlorinated biphenyls (PCBs), pesticides, waste oil, sodium nitrite, hydrazine, solvents, rust preventive, acids, grease, and red lead caulking.

The observed release is based on sediment samples collected near the storm sewer outfalls. The maximum concentrations of metals and organic compounds found at concentrations exceeding three times background concentrations are presented in the table below.

**Contaminants Found in Sediments, September 1991
Long Beach Naval Shipyard**

Contaminant	Maximum Concentration in Sediment (mg/Kg)	Background Sediment Concentration (mg/Kg)
Arsenic	24.8	7.3
Chromium	175	ND
Cobalt	26.1	ND
Lead	343	30.9
Manganese	563	118
Mercury	2.7	ND (0.14)
4,4'-DDD	490	ND (11)
4,4'-DDE	470	11
Aroclor-1254	3,800	ND (110)

ND - Non Detect

DDD - Dichlorodiphenyldichloroethane

DDE - Dichlorodiphenyldichloroethene

Dichlorodiphenyltrichloroethane (DDT) and Aroclor-1254 were detected in tissue samples collected from mussels on the Navy Mole. In addition, DDE and DDD, breakdown products of DDT, were detected in tissue samples collected from mussels on the Navy Mole. Although DDT was not detected in a sediment sample at AOC 7B, the compounds DDE and DDE were detected. This may be indicative of the fact that DDT bioaccumulates in food chain organisms but is broken down by the microorganisms in sediments to DDD and DDE. The concentrations of these contaminants in mussel tissue samples against benchmarks are presented in the table on the following page.

**Concentrations of Contaminants Found in Mussel Tissue Samples (mg/Kg)
Navy Mole, Long Beach Naval Shipyard**

Contaminant	Concentration in Mussels	FDAAL	RfD	CR
DDT*	5.75	5.0	0.65	0.0038
DDE*	167.18	5.0	NA	0.0038
DDD*	29.55	5.0	NA	0.0054
Aroclor-1254	91.63	NA	NA	0.00017

RfD - Reference Dose Screening Concentration

CR - Cancer Risk Screening Concentration

FDAAL -

* - Sum of ortho-para and para-para' constituents

SW-2: Of the contaminants present in sediment in excess of three times background concentrations and also in excess of health-based benchmark concentrations in mussel tissue, PCBs have the highest ecotoxicity/persistence factor value. PCBs have a toxicity of 10,000 and a persistence of 1.0. As per Table 4-12, a toxicity/persistence factor value of 10,000 is assigned.

SW-3: According to the Navy, approximately 350,000 gallons of various hazardous wastes were discharged to the harbor annually over 16 years. Therefore, a total of approximately 5,600,000 (28,000 cubic yards) gallons of hazardous waste was discharged to the harbor. As per Table 2-5, a hazardous waste quantity value of 11,200 is obtained. As per Table 2-6, a hazardous waste quantity factor value of 10,000 is obtained.

SW-4: The Pacific Ocean, and associated harbors and bays serve as the only recipients of discharges and runoff from the Naval Shipyard. These are all salt water bodies and are not used for drinking.

SW-5: Of the contaminants present in sediment in excess of three times background concentrations and also in excess of health-based benchmark concentrations, PCBs have the highest toxicity/persistence/bioaccumulation factor value. PCBs have a toxicity of 10,000, a persistence of 1.0, and a bioaccumulation of 50,000. As per Table 4-12, a toxicity/persistence factor value of 10,000 is assigned. As per Table 4-16, a toxicity/persistence/bioaccumulation factor value of 5×10^8 is assigned.

SW-6: Level II contamination has been documented within the West Basin of Long Beach Harbor, in which the Long Beach Naval Shipyard is located. Sediment samples collected from the discharge point from the harbor indicate the presence of several contaminants in excess of three times background concentrations. In addition, samples collected from mussels growing on the Navy Mole, located within the West Basin of Long Beach Harbor, indicate the presence of these same contaminants in excess of health-based benchmark concentrations. As per section 4.1.3.3.1, a food chain individual factor value of 45 is assigned.

SW-7: Level I contamination has not been documented at the Naval Shipyard.

- SW-8: Level II contamination has been documented based on analytical results of sediment samples collected from the Naval Shipyard. In addition, tissue samples collected from mussels located on the Navy Mole indicate the presence of those contaminants found in sediments at the Shipyard. The Navy Mole is located within the West Basin of Long Beach Harbor, which is known to be a fishery. However, commercial fishing is not conducted within the West Basin of Long Beach Harbor. The site to the farthest point of known contamination includes the entire West Basin of Long Beach Harbor. Because this area is not used for commercial fishing, data are not available regarding the amount of fish caught on an annual basis. Therefore, food chain targets are evaluated on potential contamination.
- SW-9: Based on documentation presented in the SI, approximately 159,574,000 pounds of fish is caught annually along the southern California coast within 15 miles of the Naval Shipyard. As per Table 4-18, a population value of 310,000 is obtained. As per Table 4-13, a dilution weighting factor value of 0.0001 is assigned for the various harbors and bays which make up the coastal waters in the Long Beach area.
- SW-10: The ecosystem toxicity factor values for DDT and PCBs are 10,000. The persistence value of each compound is 1.0. The bioaccumulation factor value for each compound is 50,000. As per Table 4-20, an ecosystem toxicity/persistence factor value of 10,000 is obtained. As per Table 4-21, an ecosystem toxicity/persistence/bioaccumulation factor value of 5×10^8 is assigned.
- SW-11: There is no documentation available to URS indicating that sensitive environments in the vicinity of Naval Shipyard are subject to Level I concentrations of contaminants.
- SW-12: Level II contamination has been documented based on the concentrations of PCBs and DDT (and DDT breakdown products DDE and DDD) in sediments in the West Basin of the Middle Long Beach Harbor. The Long Beach Harbor is protected under the Coastal Zone Management Act. The California brown pelican has been observed roosting on the Navy Mole, which forms the boundary of the Middle Long Beach Harbor. The California brown pelican is a federally and state designated endangered species. Therefore, Level II concentrations of contaminants attributable to the Naval Shipyard have been documented in waters protected under the Coastal Zone Management Act and an area known to be inhabited by the California brown pelican. As per Table 4-23, a value of 100 is assigned to the Long Beach Harbor, and a value of 75 is assigned to the California brown pelican.
- SW-13: Several bird, plant, and invertebrate species with special status have been documented along the coastline within the 15-mile in-water arc of the Naval Shipyard. The following table presents these species and their endangerment status.

Sensitive Environments Within the 15-Mile In-Water Arc From Naval Shipyard Long Beach, CA

Common Name	Scientific Name	Federal Status	State Status
Birds			
California brown pelican	<i>Pelecanus occidentalis californicus</i>	E	E
California least tern	<i>Sterna antillarum browni</i>	E	E
Light-footed clapper rail	<i>Rallus longirostris levipes</i>	E	E
Belding's savannah sparrow	<i>Passerculus sandwichensis beldingi</i>	C2	E
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	C2	SC
Plants			
Lyon's pentachaeta	<i>Pentachaeta lyoni</i>	C1	E
Aphanisma	<i>Aphanisma blitoides</i>	C2	None
Bright green dudleya	<i>Dudleya vitreus</i>	C2	None
Ventura marsh milk vetch	<i>Astragalus pycnostachyus var lanosissimus</i>	C1	None
Salt marsh bird's-beak	<i>Cordylanthus maritimus ssp maritimus</i>	C1	None
Beach spectacle pod	<i>Dithyrea maritima</i>	C2	T
Mexican flannelbush	<i>Fremontodendrum mexicanum</i>	C2	R
Invertebrates			
Mimic tryonia	<i>Tryonia imitator</i>	C2	None
Palos verdes blue butterfly	<i>Glaucopsyche lygdamus palosverdesensis</i>	E	None

E - Endangered

T - Threatened

R - Rare

C1 - Candidate species for which sufficient biological information exists to support the appropriateness of proposing to list the species as threatened or endangered.

C2 - Candidate species for which biological information exists indicating that listing the species as threatened or endangered is possibly appropriate, but for which substantial information is lacking to support the immediate listing of the species.

It is not known whether the Bright green dudleya, Beach spectacle pod, Mexican flannelbush, Mimic tyronia, or Palos verdes blue butterfly are species which use surface waters as their habitat. In addition, the California brown pelican has been evaluated under Level II contamination and is, therefore, not considered under potential contamination.

Air Pathway

A-1: There is no documentation available to URS indicating that an observed release to air has occurred at the Naval Shipyard.

A-2: AOC 8 has been evaluated with regard to the gas potential to release. AOC 8 consists of an area adjacent to Building 210. Approximately 200 gallons of TCE

was disposed of along the fence line north of Building 210. The area currently consists of a dirt parking lot. There is no indication that the ground surface is vegetated. Soil samples were collected in this area from 5 and 10 feet bgs during the SI. However, based on written records, it appears that TCE contamination of surface soils (< 2 feet bgs) exists in this area. As per Table 6-3, a gas containment factor value of 10 is obtained. As per Table 6-4, a source type factor value of 19 is obtained for contaminated soil. TCE has a gas migration potential value of 17.

- A-3: AOCs 11 and 12 have been evaluated with regard to the particulate potential to release.

AOC 11 consists of a hillside in the eastern portion of the Naval Shipyard. Vegetation covers part of AOC 11, but in many places soils and deposited sandblast grit are exposed. According to the Navy, 6,400 cubic yards of sandblast abrasives was used as fill. The sandblast grit contained approximately 46,000 pounds of cuprous oxide. AOC 12 is located within Parking Lot X on the eastern portion of the Naval Shipyard. AOC 12 is flat and covered mostly with gravel or asphalt. According to the Navy, up to 100 tons of sandblasting waste containing paint chips and tributyltin was disposed of in this area. In addition, empty drums were crushed in this area. The drums contained epoxy-based paints, cleaning solvents such as trichloroethene and stoddard solvent, lube oils, and other petroleum-based products.

As per Table 6-3, a gas containment factor value of 10 is obtained for both AOCs. As per Table 6-4, a particulate source type factor value of 22 is assigned to both AOCs. As per Figure 6-2, a particulate migration potential factor value of 17 is assigned for Long Beach.

- A-4: Mercury has been detected in soil samples collected from 1 foot bgs at AOC 11 at a concentration in excess of three times background concentrations. Mercury has a toxicity value of 10,000 and an air gas mobility of 0.2. As per Table 6-13, a toxicity/mobility factor value of 2,000 is obtained.
- A-5: According to SI documentation, a total volume of approximately 6,484 cubic yards of hazardous substances may have been deposited at AOCs 8, 11, and 12 at the Naval Shipyard. As per Table 2-5, a hazardous waste quantity of 2.6 is obtained. As per section 2.4.2.2 and Table 2-6, a default hazardous waste quantity factor value of 10 is obtained.
- A-6: Based on SI documentation, URS has determined that areas of contamination within AOCs 8, 11, and 12 are within 0.1 miles of regularly occupied buildings at the Naval Shipyard. An observed release to air has not been documented for any source at the Naval Shipyard. As per Table 6-16, a nearest individual factor value of 20 is assigned.
- A-7: An observed release to air has not been documented at the Naval Shipyard site. Therefore, no human populations or sensitive environments are considered subject to Level I or Level II contamination.
- A-8: The resident population within 4 miles of the Naval Shipyard is presented in the table below.

Population Distribution Within 4 Miles of the Naval Shipyard Site

Long Beach, CA

Distance from site (miles)	Population
on a source (0)	0
0 - 0.25	23,796*
0.25 - 0.5	2,300
0.5 - 1	4,701
1 - 2	27,055
2 - 3	113,412
3 - 4	155,018

* - Includes staff population of Naval Shipyard and adjacent Naval Station and Naval Supply Center Detachment.

A-9: There are no major designated recreation areas within 0.5 miles of sources of hazardous substances on-site.

A-10: The California brown pelican (*Pelecanus occidentalis californicus*), a federally and state designated endangered species, has been sighted roosting on the Navy Mole, approximately 0.5 miles from sources of hazardous substances at the Naval Shipyard.

The California least tern (*Sterna antillarum browni*) has been documented in habitats along the coastline within 2.0 miles of sources of hazardous substances at the Naval Shipyard.